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## FLOOR MATERIAL

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Applicant(s):: DAIKEN TRADE & IND CO LTD  
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### Abstract

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PURPOSE: To enable accurate work without producing any height difference and clearance between floor materials adjacent in longitudinal and lateral directions.

CONSTITUTION: A female solid part 2 with a close-fit groove part 2d opened upward is installed on the upper surface of one long side end part of a rectangular floor material main body 1, and a male solid part 3 with a projected part faced downward which can be engaged with the close-fit groove part 2d is installed on the lower surface of the long side end part of the other of it so as to prevent rise and height difference between them from producing by the close-fitting of the female and male solid parts 2 and 3 of the adjacent floor material main bodies 1 and 1. Also a displacement of it in lateral direction is restricted by the engagement of the close-fit groove part 2d with the projected part 3c so as to eliminate a clearance from producing. Then locking hooks 4 faced upward and engaged with each other and locking hooks 5 faced downward are provided at both ends on the short side of the floor material main body 1, respectively, so as to enable the close-fitting of the female and male solid parts 2 and 3 as well as the connection of the floor material main bodies 1 and 1 connected to the female and male solid parts 2, 3 in the direction at right angle to them and also to restrict the displacement of them in longitudinal direction by the engagement of the hooks 4 and 5.

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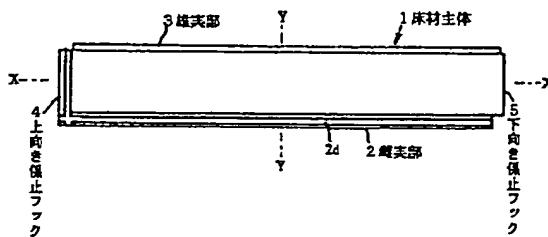
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(54)【発明の名称】床材

(57)【要約】

【目的】前後左右に隣接する床材間に段差や目隙を生じさせることなく精度のよい施工が可能な畳敷床材を提供する。

【構成】長方形状の床材主体1の一方の長辺側端部には上面に上向き開口の嵌合溝部2dを有する雌実部2が設けられ、他方の長辺側端部には下面に上記嵌合溝部2dに係合可能な下向き突条部3cを有する雄実部3が設けられて、隣接する床材主体1、1の雌雄実部2、3同士の嵌合によって互いに浮き上がりや段差を生じないようにすると共に嵌合溝部2dと突条部3cとの係合によって幅方向のずれを規制し、目隙の発生をなくする。また、床材主体1の短辺側の両端部には互いに係合可能な上向き係止フック4と下向き係止フック5とを夫々設けてあり、上記雌雄実部2、3の嵌合と同時にこれと直角方向に連なる床材主体1、1同士の連結を可能にすると共に、フック4、5同士の係合により長さ方向のずれを規制している。



（螺帽在螺栓上无定位的手段】上部目的的完成或对于无定位的螺栓，其本螺母的尺寸量与施工面的精度的公差以至千分之一毫米为宜，作装者的质量与施工面的精度的公差以至千分之一毫米为宜。在本螺母的螺栓上，前段螺母比本螺栓头部加长与之相等的长度，这样在螺栓与螺母之间便能产生足够的拉力，从而保证螺栓的强度。如果螺栓与螺母之间有间隙，则必须在螺母与螺栓头部之间垫上厚度适当的垫片，使螺母与螺栓头部接触，从而保证螺栓的强度。

（0007）

〔曲線の半蔵植物〕

は、上面側が断面L字状に切欠きされた切欠段部の先端部に係止突条部を設けてなる上向き係止フックと、下面側が断面逆L字状に切欠きされた切欠部の基端部に上記係止突条部と嵌合可能な形状に形成された係止溝部を設けてなる下向き係止フックとがそれぞれ設けられている構造を有する。

【0008】又、請求項2に記載の発明は、平面長尺四角形状に形成した床板ピースを複数枚、その側辺同士を当接して雁行状に一体化してなる床材主体の一方の少なくとも最外側の互いに平行な両端面には、下面に係合突条部を突設してなる雄実部と、上面に上記係合突条部と嵌合可能な形状に形成された嵌合溝部を有する雌実部とがそれぞれ設けられており、他方の階段状に形成された互いに平行な両端面には、上面側が断面L字状に切欠きされた切欠段部の先端部に係止突条部を設けてなる上向き係止フックと、下面側が断面逆L字状に切欠きされた切欠部の基端部に上記係止突条部と嵌合可能な形状に形成された係止溝部を設けてなる下向き係止フックとがそれぞれ設けられていることを特徴とする床材である。

【0009】更に、上記構造の床材において、請求項3に記載した発明は、床材主体が木質材の下面に可撓性基材を一体に積層してなる構造を有し、該可撓性基材に上記雄実部の係合突条部と雄実部の嵌合溝部、及び上向き係止フックと下向き係止フックの係止溝部とを形成していることを特徴とするものである。

#### 【0010】

【作用】上記構造を有する床材を床下地材上に釘や接着剤を使用することなく敷設する際に、既に敷設した床材列の入隅部分に露出している直角に隣接した実部とフック、即ち前列側の床材の後端面と敷設中の後列側の床材の一側端面とに夫々設けている雄実部と上向き係止フックとに次に敷設すべき床材の直角に隣接した雄実部と下向き係止フックを嵌合させるには、敷設すべき床材の雄実部を斜め下方に向けた状態にして該雄実部を前列側の床材の後端面に設けている雄実部に嵌め込み、この状態から該床材を徐々に寝かしていくと、雄実部に形成している嵌合溝部に雄実部に設けている係合突条部が徐々に嵌合しながら、且つ前列側の既設床材の一側端面に設けている上向き係止フックに該床材の対向側端面に設けている下向き係止フックが徐々に嵌合しながら施工される。

【0011】また、請求項2に記載した発明によれば、階段状に形成された一側端面において、既設床材の複数の入隅部分に設けた上向き係止フックに、統いて敷設される床材の下向き係止フックが嵌合しながら施工される。

【0012】施工後には、互いに嵌合した雌雄実部によって床材に浮き上がり等の上下方向のずれが生じるのを拘束すると共に、これらの雌雄実部の互いに係合した溝部と突条部とによって前後方向の変動が拘束され、さら

に、上向き係止フックと下向き係止フックとの係合によって左右方向にずれが生じるのを互いに拘束し合い、隙間の生じる虞れがない。また、請求項3に記載した発明によれば、雄実部の互いに係合する溝部と突条部、及び上向き係止フックと下向き係止フックとが可撓性を有しているので、容易に変形して円滑に係合し合い、施工性が向上する。

#### 【0013】

【実施例】本発明の実施例を図面について説明すると、1は一定幅と長さを有する長方形形状の床材主体で、一定厚みを有する合板、パーティクルボード、MDF等の木質材料から形成されており、互いに平行な長辺側の両端面を前後端面として前面には雄実部2を、後端面には雄実部3を設けている一方、互いに平行な短辺側の両端面を左右側端面として一方の側端面には上向き係止フック4を、他方の側端面には該上向き係止フック4と係合可能な形状を有する下向き係止フック5を夫々設けている。

【0014】上記雄実部2、3及び上向き係止フック4と下向き係止フック5の構造を具体的に説明すると、雄実部2は図2に示すように、床材主体1の前端面における中央の一定厚さ部分を前端面から内方に向かって一定深さ刻設することにより形成された前方に向かって開口している溝2aからなり、この溝2aの奥底から前方に向かって突出している上下水平突条部2b、2cにおいて、上側の突条部2bの前端部を所定幅、切除して該突条部2bの突出長を短く形成していると共に下側の突条部2cの上面中央部には上側の突条部2bの突出端面の前方側に向かって上方に開口した嵌合溝部2dを形成してなるものである。

【0015】雄実部3は床材主体1の後端面中央部に上記雄実部2の上側突条部2bと略同一突出長さか又はや短い突出長さでもって後方に向かって水平に突設してなる突条3aからなり、この突条3aの厚みは上記雄実部2の水平溝2aに嵌入可能な厚みに形成されていると共に該突条3aの下面側は上記雄実部2の下側突条部2cの突出幅と略等しい幅でもって断面逆L字状に切欠してあり、この切欠部3bによって形成された突条3aの下面中間部に上記雄実部2の嵌合溝部2dに嵌合可能な係合突条部3cを下方に向けて突設してなるものである。

【0016】また、床材主体1の互いに平行な短辺側において、一方の側端面に設けている上向き係止フック4は、図3に示すように、床材主体1の一側端部の上半部を一定長さ部分だけ全幅に亘って断面L字状に切欠くことによって切欠段部4aを形成し、この切欠段部4aの基端部に上面から適宜深さに達する溝4bを刻設することによって先端部に係止突条部4cを形成してなるものであり、他方の側端部に設けている下向き係止フック5は、床材主体1の他側端部の下半部を上記切欠段部4aの切欠寸法と略同一長さ部分、全幅に亘って断面逆L字状に切欠く

ことによって下向段部5aを形成し、この段部5aの基端部に下面から上方に向かった適宜深さに達する係止溝部5bを刻設すると共に先端部に係止突条部5cを形成してなるものである。

【0017】このように構成した床材を床下地材A上に施工する手順を述べると、図4、図5に示すように、床材主体1、1同士は対向する上向き係止フック4と下向き係止フック5との係合によって長さ方向に順次連結した状態で敷設され、幅方向には図6に示すように、前後の対向する床材主体1、1がその長辺端部に形成している雌雄実部2、3同士を係合させることによって順次連結した状態で敷設される。

【0018】この際、長さ方向に床材主体1を直列状態に敷設したのち、次の列に床材主体1を敷設していくものであり、従って既に敷設された前列の床材主体1における露出している後端長辺側端部の雌実部2と、この雌実部2に直角に連なる次列に敷設した床材主体1の一側端側に露出している上向き係止フック4と共に次の床材主体1の前端長辺側端部の雄実部3と他側端側の下向き係止フック5とを夫々係合させることにより該床材主体1を敷設するものである。このように、既に敷設した前列側の床材主体1の雌実部2と次列側の床材主体1の上向き係止フック4とによって直角入隅部を形成しながら、順次、床材主体1を釘着や接着剤を用いることなく敷設していくものである。

【0019】その敷設作業は、まず、図4～図6に示すように、敷設すべき床材主体1を雄実部3側が下傾端となるように幅方向に斜め下方に傾斜させた状態で該雄実部3の突条3aを前列側の床材主体1における雌実部2の溝2aの開口端に合致させると共に該溝2aに沿って長さ方向に移動されることにより雄実部3と直角に連設した短辺側の下向き係止フック5を先に敷設した床材主体1の上向き係止フック4上に対向させる。

【0020】この状態から敷設すべき床材主体1を水平方向に倒しながら雄実部3の突条3aを既設の床材主体1の雄実部2の溝2aに押し込んでいくと、下向き係止フック5の先端係止突条部5cが先に敷設した床材主体1の上向き係止フック4の溝4bに前端側から後端側に向かって徐々に嵌合していくと共に雄実部3の下面に突設したいる係合突条部3cが雄実部2の嵌合溝部2dに嵌まり込み、この状態で床材主体1床下地材A上に敷設される。

【0021】上記敷設作業を繰り返し行って床下地材A上に多数の床材列からなる床を施工するものであり、施工後においては、前後列の床材主体1、1間は図7に示すように、互いに嵌合した雌雄実部2、3によって浮き上がり等の上下方向のずれを拘束されると共にこれらの雌雄実部2、3の互いに係合した溝部2dと突条部3cによって前後方向の姿勢が拘束され、さらに、図8に示すように、上向き係止フック4と下向き係止フック5との係合によって左右方向(列の長さ方向)にずれるのを阻

止するものである。

【0022】なお、以上の実施例における床材主体1には、その下面に適宜厚みのゴム層等の弾性層を設けておいてもよく、さらに、上面に適宜な化粧層を施しておいてもよい。

【0023】次に、請求項2に記載した発明の実施例を図9、図10に基づいて説明する。床材主体1は平面長尺四角形状に形成した床板ピース1a、1b、1aを複数枚、その長い側辺同士を当接し、長さ方向にずらして雁行状に一体化してなるもので、実施例においては合板、パーティクルボード、樹脂板、紙、布、不織布、ゴム、発泡樹脂シート等の裏打材1cで連接、一体化してある。なお、一体化に際しては、床板ピース1a、1bの側面同士を接着剤にて固着したり、中央部に位置する床板ピース1bの側面に雌雄実加工を施して、同様に実加工した最外側の床板ピース1a、1aと嵌合してもよい。

【0024】そして、少なくとも最外側の床板ピース1a、1aの平行な両端面2、3に請求項1に記載した上記発明における実施例と同様に、それぞれ係合突条部3cを有する雄実部3と嵌合溝部2dを有する雌実部2を設けてある。他方の階段状に形成された互いに平行な両端面4a、5aには、上向き係止フック4と下向き係止フック5が同じく請求項1に記載した上記発明における実施例と同様に設けられてある。なお、階段状端面4a、5aと直交する端面4b、5bは、本実施例では平坦に形成されているが、前述の変形例で示した床板ピース1a、1bを雌雄実加工で嵌合、接合する場合、その実が端面4b、5bに露出する。本実施例によると、突きつけ端面が階段状であるため、離手や目立しがより目立ちにくい。

【0025】次に、図11～図15は本発明のさらに別な実施例を示すもので、上記床材主体1は木質材で形成しているが、この実施例における床材主体1Aは、その上半部1aを木質材で、下半部1bを可撓性シートで形成し、両者を一体に積層、接着してなるものである。床材主体1Aの四方端面に形成している雌雄実部2、3や上向き係止フック4、下向き係止フック5の形状については上記実施例に示した床材主体1と同一であるので詳細な説明は省略するが、図12、図13に示すように、雄実部2の下側の水平突条部2cと嵌合溝部2d、および雄実部3の切欠部3bの下層部とこの下層部から下方に向けて突出した係合突条部3cとを可撓性シートによって形成し、さらに、短辺側に設けた上向き係止フック4全体を可撓性シートにより形成すると共に下向き係止フック5の係止溝部5bの対向内面と先端係止突条部5cとを可撓性シートにより形成しているものである。なお、可撓性シートとしては、ゴムや弾性樹脂シート等の可撓性と共に弹性変形が可能なシート材が使用される。

【0026】この床材主体1Aの施工方法は上記実施例と同様であるが、雄実部2の下側水平突条部2cを可撓性シートで形成しているので、この雄実部2に敷設すべき床

材主体1Aの雄実部3を嵌合させる際に、水平突条部2cが雄実部3の押圧力に応じて圧縮変形しながら該雄実部3の係合突条部3cを嵌合溝部2dに円滑に嵌め込ませることができると共に水平突条部2cの弾性力により雄実部2の溝2aに嵌合した雄実部3を上方に押圧してその上面を雄実部2の上側突条部2bの下面に圧接させ、床材主体1A、1A間の上面を面一状態に敷設することができる。

【0027】同様に、下向き係止フック5も上向き係止フック4の押し付けに応じて圧縮変形させながら両フック4、5を円滑に係合させることができるものである。なお、上記各実施例においては、床材主体1、1Aの長辺側に雄実部2、3を、短辺側に係止フック4、5を設けているが、長辺側に係止フック4、5を短辺側に雄実部2、3を形成しておいてもよく、また、床材主体1、1Aを正方形に形成しておいてもよい。

#### 【0028】

【発明の効果】以上のように本発明の床材によれば、前後端面および左右端面が夫々互いに平行に形成されている平面四角形状の床材主体において、一方の互いに平行な両端面には、下面に係合突条部を突設してなる雄実部と、上面に上記係合突条部と嵌合可能な形状に形成された嵌合溝部を有する雌実部とがそれぞれ設けられており、他方の互いに平行な両端面には、上面側が断面L字状に切欠きされた切欠段部の先端部に係止突条部を設けてなる上向き係止フックと、下面側が断面逆L字状に切欠きされた切欠部の基端部に上記係止突条部と嵌合可能な形状に形成された係止溝部を設けてなる下向き係止フックとがそれぞれ設けられているので、既に敷設した前列の床材主体の雄実部に次に敷設すべき床材主体の雄実部を嵌合させると共に雄実部に直角に連なる次列に敷設した床材主体の上向き係止フックに下向き係止フックを係合させながら床材主体を順次簡単且つ正確に敷設することができる。

【0029】さらに、隣接する床材同士は、互いに嵌合した雌雄実部によって浮き上がり等による上下方向のずれや段差の発生をなくし得ると共に、これらの雌雄実部の互いに係合した上向き開口の溝部と下向き突条部とによって前後方向の姿勢を確実に拘束しておくことができ、その上、雌雄実部に直角に連なる上向きフック部と下向きフック部との係合によって左右方向にずれが生じるのを拘束し得るものであり、従って、地震等によっても隣接する床材間には目隠を生じさせることなく常に精度のよい施工状態を長期間に亘って維持し得るものである。

【0030】また、請求項2に記載している発明によれば、床材主体を平面長尺四角形状の床板ピースをその側面同士を当接し、雁行状に一体化してなるものであるから、床材主体の突き付け部が階段状の上向き係止フック

と下向き係止フックにて係合させながら連結され、目すきや縫合部が目立たない床施工が可能となる。

【0031】更に、雌雄実部の互いに係合する溝部と突条部、及び上向きフック部と下向きフック部とを可撓性材料で形成しておけば、施工時に変形させながら互いに嵌合、係合させることができ、施工性が一段と向上すると共に可撓性と共に弹性を付与しておくことによって床材に適度なクッション性を付与することができ、その上、雌雄実部およびフック部同士の弹性係合によって床下地材に多少の不陸や施工技術にバラツキがあってもそれを吸収して上面が面一の精度のよい床施工が可能となるものである。このように本発明の床材は釘や接着剤を使用することなく床下地材に置敷きする床材として、熟練を要することなく正確且つ容易に施工し得るものである。

#### 【図面の簡単な説明】

【図1】本発明床材の平面図、

【図2】そのY-Y線拡大断面図、

【図3】そのX-X線拡大断面図、

【図4】施工状態を示す簡略斜視図、

【図5】雌雄実部同士の係合状態を説明するための一部を断面した斜視図、

【図6】フック同士の係合状態を説明するための一部を断面した斜視図、

【図7】隣接する床材主体の雌雄実部同士が係合した敷設状態の一部断面図、

【図8】隣接する床材主体のフック同士が係合した敷設状態の一部断面図、

【図9】本発明の別な実施例を示す簡略平面図、

【図10】そのY-Y線拡大断面図、

【図11】本発明のさらに別な実施例を示す簡略平面図、

【図12】そのY-Y線拡大断面図、

【図13】そのX-X線拡大断面図、

【図14】隣接する床材主体の雌雄実部同士が係合した敷設状態の一部断面図、

【図15】隣接する床材主体のフック同士が係合した敷設状態の一部断面図。

#### 【符号の説明】

1 床材主体

2 雌実部

2d 嵌合溝部

3 雄実部

3c 係合突条部

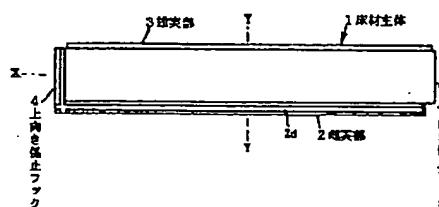
4 上向き係止フック

4c 係止突条部

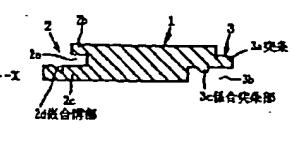
5 下向き係止フック

5b 係止溝部

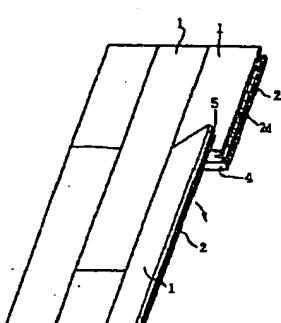
【図1】



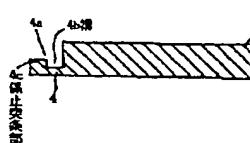
【図2】



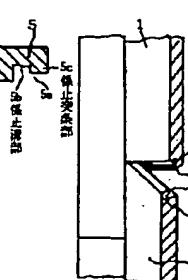
【図4】



【図3】

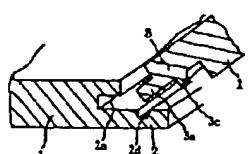
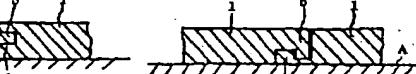


【図5】

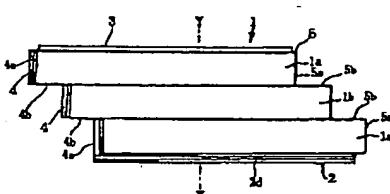


【図7】

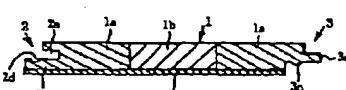
【図8】



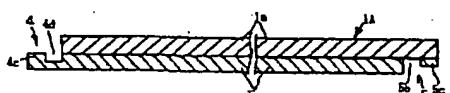
【図9】



【図10】

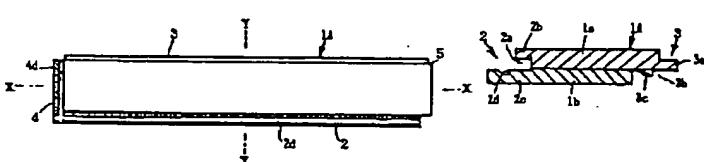


【図13】



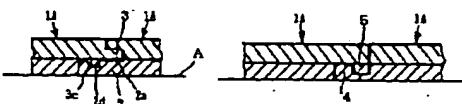
【図11】

【図12】



【図14】

【図15】





**English translation of  
the Japanese patent  
nr. 7-300979**

Japanese Unexamined Patent Publication No. 7-300979

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Application No.: 6-116024

Application Date: May 2, 1994

Inventor: Konishi et al.

Applicant: Daiken Kogyo Co., Ltd.

Title of the Invention: Floor material

[Abstract]

[Object] To provide a laid floor material which can be installed with high precision, without exhibiting offsets or gaps between pieces of floor material neighboring in the forward and rear, and right and left directions.

[Configuration]

A groove 2 having a fitting groove 2b opening upwards is formed on the upper plane of one long side edge of a rectangular piece of floor material 1, a tongue 3 having a downward-facing protrusion 3d capable of engaging the above fitting groove 2b is formed on the lower plane of the other long side edge, whereby floating or offsets of neighboring main floor material pieces 1 and 1 does not occur due to the engaging of the tongue and groove portions 2 and 3, and also, width-wise shifting is restricted by engaging of the fitting groove 2b and protrusion 3d, doing away with gaps emerging. Also, mutually-engaging upward-facing retaining hooks 4 and

downward-facing retaining hooks 5 are formed on the short ends of the main floor material 1, so that the floor material pieces 1 and 1 can be linked in a direction at right angles with the above fitting of the tongue and groove portions 2 and 3, and the engaging of the hooks 4 and 5 restrict length-wise shifting.

Claims:

1. Floor material, wherein one set of opposing and parallel ends of main floor material formed in a plane quadrangle shape each comprise a tongue having an engaging protrusion erected on the lower plane and a groove having an fitting groove portion formed so as to be fittable with said engaging protrusion on the upper plane, and wherein the other set of opposing and parallel ends each comprise an upward-facing retaining hook with a retaining protrusion provided to the tip of a notched step notched in an L-shaped cross-sectional form at the upper plane thereof and a downward-facing retaining hook with a retaining groove of a shape capable of fitting with said retaining protrusion formed at the base of a notched portion notched in a reverse-L-shaped cross-sectional form at the lower plane thereof.
2. Floor material, comprising main floor material formed of a plurality of floorboard pieces formed in a long plane

quadrangle shape and integrally aligned en echelon with the sides thereof brought into contact with one another, wherein one set of opposing and parallel ends thereof on at least the outmost side each comprise a tongue having an engaging protrusion erected on the lower plane and a groove having an fitting groove portion formed so as to be fittable with said engaging protrusion on the upper plane, and wherein the other set of opposing and parallel stepped ends each comprise an upward-facing retaining hook with a retaining protrusion provided to the tip of a notched step notched in an L-shaped cross-sectional form at the upper plane thereof and a downward-facing retaining hook with a retaining groove of a shape capable of fitting with said retaining protrusion formed at the base of a notched portion notched in a reverse-L-shaped cross-sectional form at the lower plane thereof.

3. Floor material, having a construction wherein a flexible base material is integrally layered on the lower plane of main floor material, wherein said flexible base material forms the engaging protrusion of said tongue and the fitting groove of said groove, and said upward-facing retaining hook and the retaining groove of said downward-facing retaining hook.

Detailed Description of the Invention



[0001]

#### Field of the Invention

The present invention relates to a laid floor material which is installed without using nails or adhesive agents.

[0002]

#### Description of the Related Art

Conventionally, floor material, wherein a tongue is erected on one side and a groove capable of fitting with the tongue is formed on the other side of rectangle-shaped main floor material pieces, is widely known for floor material laid on a sub-floor such as plywood or concrete slab.

However, with such floor material, the tongue and the groove portions on the opposing sides of the floor material are simply brought into tongue-and-groove contact one with another, and there is no restriction along the sub-floor in the direction of the pieces moving away from one another, so gaps and offsets easily occurred between the neighboring piece of floor material depending on the skill of the worker and irregularities in precision of the worked planes of the material.

[0003]

Accordingly the present Applicant has developed the floor material disclosed in Japanese Patent Application 4-317769. That is, regarding both opposing and parallel side edges of this floor material, a tongue portion is formed by

forming a groove opening in the horizontal direction and a groove opening in the vertical downwards direction on the tip one side end and the base lower plane respectively, a groove portion is formed by forming on the tip lower portion and base edge of the other side edge an upwards-facing protrusion capable of engaging the groove opening in the vertical downwards direction and a horizontal protrusion capable of fitting with the groove opening in the horizontal direction, thus having a tongue-and-groove structure, wherein, in the event of bringing the tongue-and-groove portions of the neighboring floor material pieces being laid into contact, the groove opening in the horizontal direction and the horizontal tongue being engaged restricts vertical shifting, while the groove opening in the vertical downwards direction and upwards-facing protrusion being fit restricts horizontal shifting.

[0004]

#### Problems to be Solved by the Invention

However, this structure has had problems, in that in the event that the floor material is laid on the sub-floor surface without using nails or adhesive agents, even though shifting can be restricted between the one set of opposing and parallel ends, the other set of opposing and parallel ends are simply abutted without any confinement, so outward force due to walking, earthquakes, etc., can cause slippage

between the sub-floor surface and the floorboards, or gaps may occur between the abutted edges due to absorption and release of moisture and the like, meaning that a floor with good precision could not be obtained.

[0005]

Such problems would seem to be solved by also providing the abutting edges of the floor material with the same sort of tongue-and-groove construction as above, but in this case, the tongue neighboring the right angle of the floor material next to the tongue neighboring the right angle exposed at the reentrant angle of an already-laid row of floor material cannot be fit in. That is, in regard to one tongue at the tongue portion neighboring the right angle exposed at the reentrant angle of the floor material, even in the event that one attempts to incline the floor material to fit the tongue portion and the lower inclined end thereof and then lower this floor material onto the sub-floor so as to fit the neighboring other tongue-and-grooves, the horizontal protrusion of one tongue portion strikes against the tongue portion of the other, thus restricting any further movement, so this work cannot be performed in reality. It has particularly been difficult to fit the stepped end portions of floor material formed of a plurality of floorboard pieces formed in a plane quadrangle shape and integrally aligned en echelon with the sides thereof brought into contact with one

another.

[0006]

The present invention has been made in light of the above, and it is an object thereof to provide a floor material which has a structure that does not shift forwards, backwards, right or left on the sub-floor, and which can be laid easily and precisely.

[0007]

In order to achieve the above objects, floor material formed with the front and rear ends and right and left ends each being parallel to one another, is formed such that one set of opposing and parallel ends of main floor material formed in a plane quadrangle shape each comprise a tongue having an engaging protrusion erected on the lower plane and a groove having an fitting groove portion formed so as to be fittable with the engaging protrusion on the upper plane, and such that the other set of opposing and parallel ends each comprise an upward-facing retaining hook with a retaining protrusion provided to the tip of a notched step notched in an L-shaped cross-sectional form at the upper plane thereof and a downward-facing retaining hook with a retaining groove of a shape capable of fitting with the retaining protrusion formed at the base of a notched portion notched in a reverse-L-shaped cross-sectional form at the lower plane thereof.

[0008]

According to the invention in Claim 2, floor material which comprises main floor material formed of a plurality of floorboard pieces formed in a plane quadrangle shape and integrally aligned en echelon with the sides thereof brought into contact with one another, is arranged such that one set of opposing and parallel ends thereof on at least the outmost side each comprise a tongue having an engaging protrusion erected on the lower plane and a groove having an fitting groove portion formed so as to be fittable with the engaging protrusion on the upper plane, and such that the other set of opposing and parallel stepped ends each comprise an upward-facing retaining hook with a retaining protrusion provided to the tip of a notched step notched in an L-shaped cross-sectional form at the upper plane thereof and a downward-facing retaining hook with a retaining groove of a shape capable of fitting with the retaining protrusion formed at the base of a notched portion notched in a reverse-L-shaped cross-sectional form at the lower plane thereof.

[0009]

Further, according to the invention in the third Claim, floor material which has a construction wherein a flexible base material is integrally layered on the lower plane of main floor material, is arranged such that the flexible base

material forms the engaging protrusion of the tongue and the fitting groove of the groove, and the upward-facing retaining hook and the retaining groove of the downward-facing retaining hook.

[0010]

[Operation]

In the event of laying the floor material having the above structure on a sub-floor surface, without using nails or adhesive agent, in order to fit the hook and tongue neighboring the right angle exposed at the reentrant angle of an already-laid row of floor material, i.e., in order to fit the downward-facing retaining hook and the tongue neighboring the right angle of the floor material to be laid next with the groove and upward-facing retaining hook each provided to the rear edge plane of floor material at the forward row and one side edge of the floor material being laid at the rear side, the tongue of the floor material to be laid is fit into the groove provided to the rear end plane of the floor material laid at the front row side, with the floor material in an inclined state, from which gradually laying the floor material down gradually fits the retaining protrusion provided on the tongue with the fitting groove formed on the groove portion, while the downward-facing retaining hook provided on the opposing side edge of the floor material fits with the upward-facing retaining

hook provided on the one edge side of the floor material already laid at the front row side.

[0011]

Also, according to the invention described in Claim 2, the downward-facing retaining hook of the floor material to be subsequently laid is fit with the upward-facing hook provided to the reentrant angle of the multiple pieces of already laid floor material, at one side edge plane formed in a stepped form, and thus is installed.

[0012]

Following laying, the mutually fit tongue-and-groove portions confine shifting in the vertical direction such as floating of the floor material, and fitting of the upward-facing retaining hook and the downward-facing retaining hook mutually confine movement in the left and right directions, so there is no worry of gaps emerging. Also, according to the invention described in Claim 3, the groove and protrusion of the tongue-and-groove, and upward-facing retaining hook and the downward-facing retaining hook each have flexibility, so as to easily deform and smoothly fit one another, which improves ease of installation.

[0013]

[Embodiments]

Making description of an embodiment of the present invention with reference to the drawings, reference numeral

1 denotes main floor material having a constant width and length, formed of plywood, particle board, MDF, or other likewise wood material, wherein with the mutually parallel long-side edges as the front and rear edge planes, the front edge plane has a groove 2 and the rear edge has a tongue 3, while with the mutually parallel ends on the short side as the left and right edges, one side edge plane has an upward-facing retaining hook 4, and the other side edge plane has a downward-facing retaining hook 5 having a form which can be fit with the upward-facing retaining hook 4.

[0014]

Making specific description of the above tongue-and-groove portions 2 and 3, and the upward-facing retaining hook 4 and downward-facing retaining hook 5, as shown in Fig. 2, the groove 2 is formed of a groove 2a formed opening toward the front direction by being cutting out a portion of a certain thickness at the center of the front edge side of the main floor material 1 from the front side inwards; and at the top and bottom horizontal protrusions 2b and 2c protruding forwards from the far side of this groove 2a, the front edge portion of the protrusion 2b at the top side is cut by a certain width so as to form the protruding length of the protrusion 2b shorter, while a fitting groove 2d opening upwards at the front side of the protruding edge plane of the top protrusion 2b is formed at the upper plane

center portion of the bottom protrusion 2c.

[0015]

The tongue 3 is formed of a tongue 3a erected on the rear edge plane center portion of the floor material 1, horizontally toward the rear side with a length which is generally the same protruding length as the top protrusion 2b of the groove 2 or slightly shorter, wherein the thickness of this protrusion 3a is formed to a thickness which can be fit into the horizontal groove 2a of the above groove 2 and the lower plane side of the protrusion 3a is notched in a reverse-L-shaped cross-section form at a width generally the same as the protruding width of the lower protrusion 2c of the above groove 2, and an engaging protrusion 3c capable of fitting to the fitting groove 2d of the groove 2 erected in a downward-facing direction at the middle portion of the lower plane of the protrusion 3a formed by this notched portion 3b.

[0016]

Also, at the mutually parallel short end side of the main floor material 1, the upward-facing retaining hook 4 formed at one side edge plane, a notched step portion 4a is formed in an L-shaped cross-section over the entire width of a certain length portion on the upper half portion of one side edge of the main floor material, and a groove 4b reaching a certain depth is cut out from the upper plane of

the base portion of this notched step portion 4a, thereby forming a retaining protrusion 4c at the tip edge portion, while a downward-facing step portion 5a is formed by notching in an reverse-L-shaped cross-section over the entire width of a portion of generally the same length as the notched dimensions of the above notched step portion 4a on the lower half portion of the other side edge of the main floor material 1, and a groove 5b reaching a certain depth is cut out from the lower plane of the base portion of this notched step portion 5a, also forming a retaining protrusion 5c at the tip edge portion.

[0017]

Now, making description regarding the procedures for laying the floor material thus configured on a sub-floor A, as shown in Fig. 4 and Fig. 5, the main floor material pieces 1 and 1 are sequentially linked in the longitudinal direction by opposing upward-facing retaining hooks 4 and downward-facing retaining hooks 5 being engaged, and thus laid, and in the width direction, as shown in Fig. 6, the tongue-and-groove portions 2 and 3 form on the long side of the front and rear sides of the main floor material pieces 1 and 1 are mutually engaged, thus being laid in a sequentially linked state.

[0018]

At this time, the arrangement is such that the main

floor material pieces 1 are laid in the length direction in a straight row, following which the main floor material pieces 1 are laid for the next row, and accordingly, the groove 2 of the rear long side edge exposed on the already-lain former row of main floor material pieces 1, and the upward-facing retaining hook 4 exposed at one edge side of the main floor material pieces 1 laid as a next row linking to this groove 2 at a right angle, are engaged with the tongue 3 of the front long side edge and the downward-facing retaining hook 5, thereby installing the main floor material pieces 1. Thus, main floor material pieces 1 can be sequentially installed without using nails or adhesive agents, by forming right-angle reentrant angles between the grooves 2 of the main floor material pieces 1 and the upward-facing retaining hooks 4 of the main floor material pieces 1.

[0019]

In order to perform this work, first, the main floor material piece 1 to be laid is inclined such that the tongue 2 side is downwards, the protrusion 3a of the tongue 3 is fit to the opening end of the groove 2a of the groove 2 of the main floor material piece 1 of the front row side, and the main floor material piece 1 to be laid is moved in the longitudinal direction following the groove 2a, thereby causing the downward-facing retaining hook 5 of the short

side linked to the tongue 3 at right angles to face the upward-facing retaining hook 4.

[0020]

From this state, the main floor material piece 1 to be laid is lowered in the horizontal direction, while pressing the protrusion 3a of the tongue 3 into the groove 2a of the groove 2 of the main floor material piece 1, whereby the tip retaining protrusion 5c of the lower-facing retaining hook 5 gradually fits with the groove 4b of the upward-facing retaining hook 4 in the rearward direction, and also the engaging protrusion 3c erected on the lower plane of the tongue 3 fits into the fitting groove 2d of the groove 2, and the main floor material piece 1 is laid on the sub-floor A in this state.

[0021]

The above work is repeatedly performed so as to lay a floor of a great number of rows of floor material on the sub-floor A, and following installation, vertical movement between the main floor material pieces 1 and 1 such as floating is confined by the mutually-engaged tongue-and-grooves 2 and 3, forward and backward movement is confined by the mutually-engaged groove 2d and protrusion 3c of the tongue-and-grooves 2 and 3 as shown in Fig. 7, and further, as shown in Fig. 8, shifting in the left and right directions (longitudinal direction of the row) is prevented

by the upward-facing retaining hook 4 and downward-facing retaining hook 5 being engaged.

[0022]

Incidentally, an elastic layer of a rubber layer or the like having an appropriate thickness may be placed on the bottom side of the floor material 1 in the above embodiment, and further, an appropriate decorative layer may be applied on the top surface thereof.

[0023]

Next, an embodiment of the invention described in Claim 2 will be described based on Fig. 9 and Fig. 10. The floor material 1 is formed of a plurality of floorboard pieces 1a, 1b, 1a formed in a long plane quadrangle shape and integrally aligned en echelon with the longer sides thereof brought into contact with one another, and in the present embodiment, these are integrally linked by a backing material 1c such as plywood, particle board, resin plate, paper, cloth, non-woven fabric, rubber, resin foam sheeting, etc. Also, at the time of integral forming, the sides of the floorboard pieces 1a and 1b may be fixed with an adhesive agent, or forming a tongue-and-groove structure on the sides of the centrally-positioned floorboard piece 1b so as to fit the likewise-formed outward-most floorboard pieces 1a and 1a.

[0024]

Then, the parallel edge planes 2 and 3 of at least the outward-most floorboard pieces 1a and 1a are provided with a tongue 3 having a retaining protrusion 3c and a groove 2 having a fitting groove 2d, as with the first embodiment. At the other mutually parallel stepped ends 4a and 5a are provided upward-facing retaining hooks 4 and downward-facing retaining hooks 5, as with the embodiment of the above invention described in Claim 1. Incidentally, the end planes 4b and 5b which meet the stepped end planes 4a and 5a are formed flat in the present embodiment, but in the event of fitting and connecting the floorboard pieces 1a and 1b by tongue-and-groove working as described in the above variation, the tongue thereof is exposed at the end planes 4b and 5b. According to the present embodiment, the abutting end plane is in a stepped form, so joints and gaps are less obvious.

[0025]

Next, Fig. 11 through Fig. 15 illustrate a further embodiment of the present invention, and though the main floor material 1 above is formed of a wood material, the main floor material 1A according to the present embodiment has the upper half portion 1a formed of a wood material and the lower half portion 1b thereof formed of a flexible sheet, with these both being integrally layered and fixed by adhesion. The forms of the tongue-and-groove portions 2 and

3. the upward-facing retaining hook 4 and downward-facing retaining hook 5 formed on the edges on the four sides are the same as with the main floor material 1 described in the above embodiment, so detailed description thereof will be omitted, but as shown in fig. 12 and Fig. 13, the horizontal protrusion 2c at the lower side of the groove 2 and the fitting groove 2d, and the lower layer portion of the notch 3b of the tongue 3 and the engaging protrusion 3c protruding downwards from this lower layer portion are formed of a flexible sheet, and further, the entirety of the upward-facing retaining hook 4 provided on the short side is formed of a flexible sheet, and the opposing inner surface of the retaining groove of the downward-facing retaining hook 5 and the tip retaining protrusion 5c thereof are formed of a flexible sheet. Incidentally, the flexible sheet used is a sheet material such as rubber or an elastic resin sheet, having flexibility and also elastic deformability.

[0026]

The method of installing this main floor material 1A is the same as the above embodiments, but the lower side horizontal protrusion 2c of the groove 2 is formed of a flexible sheet, so at the time of fitting with the tongue 3 of the main floor material 1A to be installed to this groove 2, the horizontal protrusion 2c is compressed and deformed by the pressing force of the tongue 3 and the engaging

protrusion 3c is thus smoothly fit into the fitting groove 2d, while the tongue which has fit with the groove 2a of the groove 2 by is pressed upwards by the resilience of the horizontal protrusion 2c such that the upper plane thereof comes into pressed contact with the lower plane of the upper side protrusion 2b of the groove 2, consequently allowing the upper plane of the main floor material 1A and 1A to be laid as a single plane.

[0027]

In the same way, the downward-facing retaining hook 5 also is compressed and deformed according to the pressing of the upward-facing retaining hook 4 so the hooks 4 and 5 can be smoothly engaged. Incidentally, in the above embodiments, the tongue-and-groove 2 and 3 are provided to the long sides of the main floor material 1 and 1A, and the hooks 4 and 5 are provided to the short sides thereof, but an arrangement may be made wherein the tongue-and-groove 2 and 3 are provided to the short sides and the hooks 4 and 5 are provided to the long sides; further, the main floor material 1 and 1A may be formed as true squares.

[0028]

[Advantages]

According to the floor material of the present invention described above, floor material formed with the front and rear ends and right and left ends each being

parallel to one another, is formed such that one set of opposing and parallel ends of main floor material formed in a plane quadrangle shape each comprise a tongue having an engaging protrusion erected on the lower plane and a groove having an fitting groove portion formed so as to be fittable with the engaging protrusion on the upper plane, and such that the other set of opposing and parallel ends each comprise an upward-facing retaining hook with a retaining protrusion provided to the tip of a notched step notched in an L-shaped cross-sectional form at the upper plane thereof and a downward-facing retaining hook with a retaining groove of a shape capable of fitting with the retaining protrusion formed at the base of a notched portion notched in a reverse-L-shaped cross-sectional form at the lower plane thereof, so the tongue of the main floor material to be laid next is fit into the tongue of the main floor material of the row already laid, and the downward-facing retaining hook is engaged with the upward-facing retaining hook of the main floor material lead in the next row linked at right angles with the groove, so the main floor material can be installed in an easy and precise manner.

[0029]

Further, vertical shifting such as floating or offsets between neighboring pieces of floor material can be prevented by the mutually fit tongue-and-groove portions,

forward and rear movement can be confined in a sure manner by the mutually-engaged groove of the upward-facing opening and downward-facing protrusion of the tongue-and-groove portions, and further, right and left shifting is confined by upward-facing hook portion linked at right angles to the tongue-and-groove portions engaging the downward-facing hook portion, so a precise installation state can be maintained over long periods of time, without gaps occurring between the pieces of floor material due to earthquakes and the like.

[0030]

Also, according to the invention described in Claim 2, main floor material is formed of a plurality of floorboard pieces formed in a long plane quadrangle shape and integrally aligned en echelon with the sides thereof brought into contact with one another, so the abutting portion of the main floor material is linked by engaging the stepped upward-facing retaining hooks and the downward-facing retaining hooks, thus enabling floor installation wherein gaps and joints are not evident.

[0031]

Further, forming the mutually engaging groove and protrusion and upward-facing hooks and the downward-facing hooks of a flexible material, the pieces can be fit and engaged while being deformed at the time of installation, thus further improving installability, and also providing

the floor material with appropriate cushioning providing resilience, so that even in the event that there is some unevenness on the sub-floor or irregularities in the installation skills, this can be absorbed, and precise floor installation with a single upper plane can be performed. Thus, the present invention provides a floor material which is laid on a sub-floor without using nails or adhesive agents, and which can be precisely and easily installed without requiring skill.

[Brief Description of the Drawings]

[Fig. 1] Fig. 1 is a plan view of the floor material according to the present invention.

[Fig. 2] Fig. 2 is an enlarged cross-sectional view along line Y-Y thereof.

[Fig. 3] Fig. 3 is an enlarged cross-sectional view along line X-X thereof.

[Fig. 4] Fig. 4 is a simplified perspective view of the state of installation.

[Fig. 5] Fig. 5 is a perspective view of a cross-section of one portion in order to describe the engaged state of the tongue and groove portions.

[Fig. 6] Fig. 6 is a perspective view of a cross-section of one portion in order to describe the engaged state of the hooks.

[Fig. 7] Fig. 7 is a partial cross-section view to describe

the engaged state of the tongue and groove portions of neighboring floor material.

[Fig. 8] Fig. 8 is a partial cross-section view to describe the engaged state of the hooks of neighboring floor material.

[Fig. 9] Fig. 9 is a simplified plan view showing another embodiment of the present invention.

[Fig. 10] Fig. 10 is an enlarged cross-sectional view along line Y-Y thereof.

[Fig. 11] Fig. 11 is a simplified plan view showing yet another embodiment of the present invention.

[Fig. 12] Fig. 12 is an enlarged cross-sectional view along line Y-Y thereof.

[Fig. 13] Fig. 13 is an enlarged cross-sectional view along line X-X thereof.

[Fig. 14] Fig. 14 is a partial cross-section view to describe the engaged state of the tongue and groove portions of neighboring floor material.

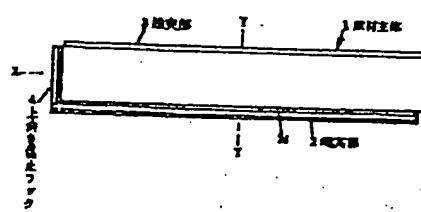
[Fig. 15] Fig. 15 is a partial cross-section view to describe the engaged state of the hooks of neighboring floor material.

[Reference Numerals]

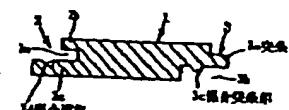
- 1 Main floor material
- 2 Groove
- 2d Fitting groove
- 3 Tongue
- 3c Engaging protrusion

- 4 Upward-facing retaining hook
- 4c Retaining protrusion
- 5 Downward-facing retaining hook
- 5b Retaining groove

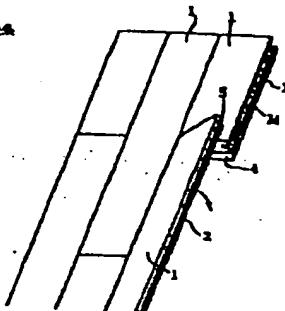
【図1】



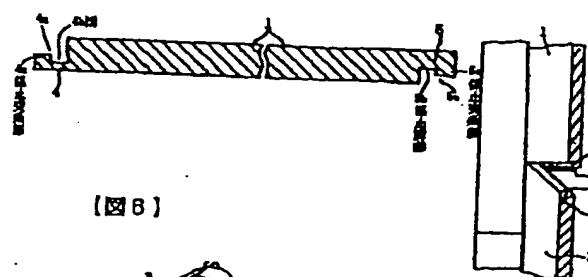
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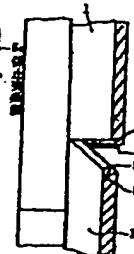
【図4】



【図3】



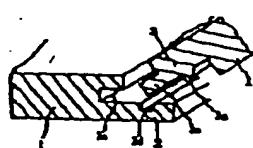
【図5】



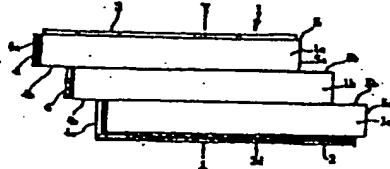
【図7】



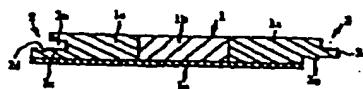
【図8】



【図9】



【図10】



【図11】



【図12】



【図14】



【図15】

